

**CLAIMS**

1. Matrix structure of multispectral detectors comprising:

- 5                   - a superimposition of several layers of semiconductor material separated by layers of dielectric material transparent to a light to be detected , said superimposition offering a face for receiving the light to be detected, said superimposition of layers of semiconductor material being spread out in picture elements or pixels, each part of the layer of semiconductor material corresponding to a pixel comprising a light detection element delivering electrical charges in response to the light received by said detection element,
- 15                   - means for collecting the electrical charges delivered by each light detection element, said collection means being electrically connected to electrical connection means and comprising conductive walls filling trenches formed in the superimposition of layers of semiconductor material to assure an electrical contact with all of the layers of semiconductor material and to form an electrode common to all of the detection elements.
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2. Structure according to claim 1, wherein it has the form of a wafer having two principal opposite faces: a first face that is the face for receiving the light to be detected and a second face electrically insulated and supporting the electrical connection means.

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3. Structure according to claim 2, wherein second face constitutes a hybridisation face with a device for exploiting the electrical charges collected.

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4. Structure according to claim 1, wherein the collection means comprise conductive feedthroughs.

5                5. Structure according to claim 4, wherein the conductive feedthroughs are lodged in sinks, each sink having a depth that makes it possible to reach a corresponding detection element in crossing, without electrical contact, at least one of said layers of dielectric semiconductor material.

10              6. Structure according to claim 1, wherein said detection element comprises at least one semiconductor junction.

15              7. Structure according to claim 6, wherein said semiconductor junction is constituted by the presence of a doped zone in said part of the layer of semiconductor material.

20              8. Structure according to claim 1, wherein the trenches are formed along a network of arrays such that an array contains several detection elements.

25              9. Structure according to claim 1, wherein the trenches are formed along a network of arrays such that an array contains a single detection element.

30              10. Structure according to claim 1, wherein the conductive walls are in electrical contact with the layers of semiconductor material by doped zones of said layers of semiconductor material.

11. Structure according to claim 1, wherein the conductive walls are locally electrically insulated from the detection elements and the common electrode to constitute electrical charge storage capacitors.

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12. Structure according to claim 1, wherein the means of reflecting the light are arranged above the conductive walls in order to reflect the light to be detected, directed towards the conductive walls, towards the elements adjacent to the conductive walls.

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13. Structure according to claim 1, wherein said superimposition comprises layers of semiconductor material of different nature.

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14. Structure according to claim 1, wherein the superimposition comprises  $n$  layers of semiconductor material, the thickness of each layer is determined as a function of  $n$  wavelength ranges defined from the light spectrum so that the layer of semiconductor material located the nearest to the face for receiving the light absorbs virtually all of a first defined wavelength range, the two layers of semiconductor material located nearest the face for receiving the light absorb virtually all of a second defined wavelength range, and so on until  $n$ , the intensities measured by each detection element of a same pixel making it possible to restore, as a function of the absorption coefficients of each layer of semiconductor material, the intensities of each of the  $n$  wavelengths received by the pixel.

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